

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of	)	
	)	
Wireless Telecommunications Bureau Seeks	)	WT Docket No. 21-195
Comment on the Impact of the Global	)	
Semiconductor Shortage on the U.S.	)	
Communications Sector	)	

**COMMENTS OF NCTA – THE INTERNET & TELEVISION ASSOCIATION**

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**COMMENTS OF NCTA – THE INTERNET & TELEVISION ASSOCIATION**

NCTA – The Internet & Television Association (NCTA)<sup>1</sup> submits these comments in response to the Wireless Telecommunications Bureau’s (the Bureau) Public Notice requesting comments regarding the “potential impacts of a continuing global shortage of semiconductors on the U.S. communications industry and on Federal Communications Commission priorities and initiatives.”<sup>2</sup>

**INTRODUCTION**

NCTA appreciates the opportunity to comment on the Bureau’s Public Notice, which correctly highlights that “[a] shortfall in the global supply of semiconductors can have consequences for the U.S. communications industry and for Commission priorities and initiatives . . . including increased lead times . . . or cost increases.”<sup>3</sup> NCTA, joined by industry associations that collectively represent the nation’s leading broadband providers, wrote to

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<sup>1</sup> NCTA is the principal trade association of the cable television industry in the United States, which is a leading provider of residential broadband service to U.S. households. Its members include owners and operators of cable television systems serving nearly 80% of the nation’s cable television customers, as well as more than 200 cable program networks.

<sup>2</sup> *Wireless Telecommunications Bureau Seeks Comment on the Impact of the Global Semiconductor Shortage on the U.S. Communications Sector*, Public Notice, WT Docket No. 21-195, DA 21-550, at 1 (rel. May 11, 2021) (Public Notice).

<sup>3</sup> *Id.* at 2.

President Biden on February 24, 2021 to express strong support for the Administration’s “early focus on the supply chain for semiconductor chips, which are critical to today’s broadband networks and the next generation of broadband services that [Internet service providers] are deploying to keep Americans connected.”<sup>4</sup> The study called for by Executive Order 14017—which recognized that semiconductors are “the linchpin” of high-speed broadband infrastructure—is an important step toward ensuring America’s continued competitiveness in the global economy.<sup>5</sup> However, it is necessary and appropriate that the Federal Communications Commission (Commission) takes steps to understand the impact of the shortage on the communications industry and its own priorities—including its broadband funding programs—and proactively work with government leaders within the Administration and Congress to ensure that the paramount national interest in supporting increased broadband deployment and access is appropriately recognized and prioritized in developing policies to bolster semiconductor supply chain resiliency.

The COVID-19 pandemic has resulted in strong demand for consumer and network electronics that require semiconductor chips. While working, learning, and seeing doctors from home, consumers around the world have updated their laptops, smartphones, tablets, gaming systems, television set-top boxes, and home networking equipment and relied more heavily on cloud-computing services and their associated data centers, putting unprecedented strain on the

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<sup>4</sup> Letter from ACA Connects – America’s Communications Association, CTIA, NCTA – The Internet & Television Association, and USTelecom – The Broadband Association to Joseph R. Biden, Jr., President of the United States (Feb. 24, 2021).

<sup>5</sup> The White House, *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth: 100-Day Reviews under Executive Order 14017* (June 2021), <https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf>.

semiconductor industry to produce the chips required to power such devices.<sup>6</sup> Recent events further underscore the fragility of the global supply chain for semiconductors. This spring, for example, a fire devastated one of the world's largest chip manufacturers in Japan,<sup>7</sup> a container ship ran aground and blocked the Suez Canal stalling billions of dollars in global trade,<sup>8</sup> and the worst drought in decades hit Taiwan, slowing semiconductor production which "require[s] voluminous quantities of water to churn out chips."<sup>9</sup> These unanticipated occurrences follow on top of more than a year of similarly unpredictable events, including prior factory fires and restrictions in the global transportation system.<sup>10</sup> Such events have exposed supply chain vulnerabilities—including in particular over-dependence on a small number of foreign suppliers.

As a result of these supply chain issues, every industry sector that depends on semiconductors—including providers of broadband Internet access and cable television services—is seeing increased lead times and rising costs that threaten to slow innovation and harm American consumers. Indeed, broadband providers have seen product lead times more

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<sup>6</sup> See Asa Fitch and Elizabeth Koh, *Chips Are in Hot Demand—and That's a Problem*, The Wall Street Journal (Jan. 14, 2021), <https://www.wsj.com/articles/chips-are-in-hot-demandand-thats-a-problem-11610630859>.

<sup>7</sup> Yang Jie, *Fire at Giant Auto-Chip Plant Fuels Supply Concerns*, The Wall Street Journal (Mar. 23, 2021), <https://www.wsj.com/articles/renesas-chip-plant-fire-spreads-concerns-about-global-auto-production-11616414181>.

<sup>8</sup> Vivian Yee and Peter S. Goodman, *Suez Canal Blocked After Giant Container Ship Gets Stuck*, The New York Times (Mar. 24, 2021), <https://www.nytimes.com/2021/03/24/world/middleeast/suez-canal-blocked-ship.html>.

<sup>9</sup> See Stephanie Yang, *The Chip Shortage Is Bad. Taiwan's Drought Threatens to Make It Worse.*, The Wall Street Journal (Apr. 16, 2021), [https://www.wsj.com/articles/the-chip-shortage-is-bad-taiwans-drought-threatens-to-make-it-worse-11618565400?mod=hp\\_featst\\_pos5](https://www.wsj.com/articles/the-chip-shortage-is-bad-taiwans-drought-threatens-to-make-it-worse-11618565400?mod=hp_featst_pos5).

<sup>10</sup> See Bindiya Vakil and Tom Linton, *Why We're in the Midst of a Global Semiconductor Shortage*, Harvard Business Review (Feb. 26, 2021), <https://hbr.org/2021/02/why-were-in-the-midst-of-a-global-semiconductor-shortage>.

than double in recent months, with unfulfilled orders set to be delivered a year or more after they were placed. These slowdowns will have ripple effects throughout the broadband ecosystem, including slowing the pace of new deployment and service improvements, potentially stranding tens of billions of dollars in federal investment in broadband while leaving consumers and businesses without the bandwidth they need to connect and compete. For example, the Commission's recent launch of the Emergency Broadband Benefit Program, which provides critical support to low-income consumers to purchase broadband services and connected devices, risks being hampered by shortages in consumer technology that will likely continue into next year.<sup>11</sup> Even without accounting for such harms to customers, the broadband industry itself expects adverse impacts amounting to hundreds of millions of dollars based on cost increases and diminished sales.

For all of these reasons and as described further below, NCTA appreciates the urgency with which the Commission, the Administration, and Congress are approaching this challenge and looks forward to working with all stakeholders to shape policy initiatives to ease the shortage and to improve domestic research and development and production of key semiconductor resources going forward. In particular, in the near term, NCTA urges the Commission to ensure that the needs of the communications sector are given substantial weight as policymakers take action to ameliorate constraints in the semiconductor supply chain. We recommend that the Commission work closely with Congress to convey the gravity of the chip shortage for broadband service and related products and devices and to emphasize the potential

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<sup>11</sup> See Josh Taylor, *Acer Says Global Chip Shortage to Slow Laptop Production Until at Least Next Year*, The Guardian (May 31, 2021), <https://www.theguardian.com/technology/2021/jun/01/acer-says-global-chip-shortage-to-slow-laptop-production-until-at-least-next-year>.

repercussions for the economy as a whole should broadband investment and deployment continue to be materially thwarted by semiconductor scarcity. The situation for broadband providers is every bit as serious and consequential as it is for the auto industry and other affected sectors, with the difference being that the most serious adverse effects for broadband appear to be ahead of – and not behind – us. In the long term, the Commission, in coordination with the Department of Commerce and other relevant agencies, should recommend a course of action that supports investment in the expansion of domestic innovation and manufacturing capacity for semiconductors. The Commission should help educate other government leaders regarding the essential role played by broadband networks in our economy and society and the critical importance of semiconductors to national efforts to expand broadband capabilities and bridge the digital divide.

## **DISCUSSION**

NCTA appreciates the Administration’s vigorous response to the ongoing crisis stemming from interruptions in the semiconductor supply chain and the Commission’s interest in understanding the impact of the global shortage on the communications sector. Together with the rest of the broadband industry, NCTA urges the Commission to work with other federal agencies and Congress to ensure that any targeted governmental interventions in the marketplace account for the critical needs of broadband and cable providers to obtain chipsets for modems, routers, set-top boxes, and other network equipment essential to the provision of broadband and cable television services. The vital national policy interest in facilitating increased broadband deployment and bridging the digital divide militates in favor of government action to help ameliorate the supply chain issues afflicting broadband providers. In addition, the Commission

should consider these issues in a holistic way, identifying and developing solutions that leverage the efforts underway by Congress and other federal agencies.

**I. The Commission Should Advocate for the Communications Sector To Ensure That Broadband Providers Are Appropriately Prioritized As Critical Users of Semiconductors**

In his remarks prior to signing E.O. 14017, President Biden recognized that semiconductors are “a wonder of innovation and design that powers so much of our country, enables so much of our modern lives to go on — not just our cars, but our smartphones, televisions, radios, medical diagnostic equipment, and so much more.”<sup>12</sup> The President rightly recognized that semiconductors underpin much of the American economy, including our communications infrastructure. Consistent with the President’s Order, the Bureau’s Public Notice appropriately “seeks comment on the impact of semiconductor supply chain constraints and other supply chain challenges on the communications sector, on Commission priorities and initiatives, and on steps the Commission can take to ensure a resilient supply chain for communications technologies now and in the future.”<sup>13</sup> While each industry has been impacted in its own way, the Commission should recognize the particular impact on the communications sector, including broadband providers, and work with federal partners to ensure that government approaches the failure to sustain or develop elements of the semiconductor supply chain in a

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<sup>12</sup> Remarks by President Biden at Signing of an Executive Order on Supply Chains, The White House, (Feb. 24, 2021), <https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/02/24/remarks-by-president-biden-at-signing-of-an-executive-order-on-supply-chains>.

<sup>13</sup> Public Notice at 2.



manner that accounts for the vital national interest in promoting increased broadband deployment and universal access.

The impacts of constricted semiconductor supply on the broadband and cable television industry are substantial and widespread. NCTA members have reported that lead times for semiconductors have gone from around 18 weeks in early 2020 to 50 weeks or more today as suppliers struggle to keep up with demand. When added to the time required to manufacture and transport devices, broadband providers now expect to receive new network equipment more than a year after orders are placed in some instances. As a result, broadband providers have in some cases been forced to scale back marketing campaigns and limit efforts to expand coverage to new areas, including unserved and underserved communities with a particularly acute need for expanded broadband access—especially during the COVID-19 pandemic. By one NCTA member estimate, in 2021 alone more than five million homes and businesses will miss out on new or upgraded equipment as a result of equipment delays associated with ongoing semiconductor shortages. Similar delays impact the manufacture and delivery of set-top boxes necessary to deliver cable television service to customer homes. Apart from such customer equipment shortfalls, broadband providers are facing comparable delays in receiving network switches, routers, and servers, slowing the rate of growth for urgently needed additional bandwidth. Shortages in semiconductors and the associated delays will result in hundreds of millions of dollars in impact to the broadband and cable television industry this year.

Delivering broadband to residential and commercial customers requires continuous innovation and investment at tremendous scale. At the highest level of their networks, broadband providers operate, maintain, and expand racks of computing equipment that power the global Internet. These industrial-scale routers, switches, and servers operate every minute of

every day to send data packets across the country and around the world. Further down the networks, cable broadband providers operate Converged Cable Access Platforms (CCAP), Cable Modem Termination Systems (CMTS), power systems, and additional equipment for routing traffic and managing user modems. These sophisticated network hubs routinely require new and upgraded equipment to ensure that sufficient bandwidth reaches end users. And finally, at the point of service, modems, Wi-Fi routers, and other equipment power the connection for consumers and businesses alike. At every level of a broadband network, the Internet is powered by semiconductors.

Delivering broadband and cable television services requires deploying dozens of semiconductors within each American home, on top of the countless chips that power the rest of the network. For example, the cable modems that provide broadband connectivity to many American homes can have as many as 10 semiconductors apiece. And many additional chips are used to power and control the Wi-Fi routers and extenders that enable connectivity from laptops, tablets, mobile phones, and other connected devices throughout our homes, and still more are used in the set-top boxes used to deliver cable television service. Broadband providers deploy tens of millions of modems and routers each year as new customers add service and existing customers upgrade services. All told, broadband providers spend hundreds of millions of dollars each year to upgrade and maintain network equipment, each aspect of which depends on semiconductors that control the operations, power supplies, and network connections that make the Internet function.

Never have these investments proven more important than in the last year. American broadband networks have performed extremely well during the COVID-19 pandemic, despite significant shifts in the volume, timing, and location of usage. Users have never demanded so

much of their already-important Internet connections. That said, COVID-19 has also exposed the serious consequences for consumers who do not have sufficient access to broadband, and the demand for fast and reliable connections has never been higher. The broadband industry has responded to this demand with billions of dollars in new investments at all levels of their networks. As millions of Americans are working from home, schools have gone remote, and telemedicine visits have become the norm, broadband providers have been deploying new equipment—again, invariably relying on semiconductors—to keep people connected. These investments have helped to close the homework gap while driving economic growth and keeping people employed during a time of tremendous uncertainty.

While NCTA’s members have made the necessary investments to keep America connected, more is needed to keep up with the growing appetite for bandwidth and connectivity, as the Biden Administration, the Commission, and Congress have recognized by prioritizing billions of dollars in broadband investment. Despite the substantial network investments made over the last year, progress on closing the digital divide will be hampered if semiconductor supply chain delays and shortfalls persist. Congress appropriated more than \$3 billion to fund the Emergency Broadband Benefit Program and more than \$7 billion in additional funding for the Emergency Connectivity Fund. The Commission also has committed \$9.2 billion in subsidies through the Rural Digital Opportunity Fund to expand broadband into unserved areas, and the President has proposed spending tens of billions more to meet this burgeoning need for broadband connectivity. The full potential of these initiatives will not be realized without sufficient consumer and network equipment to support deployment.

The importance of the next broadband upgrade and maintenance cycle is magnified by demands on capacity and changes in network usage resulting from the pandemic. Further, these

upgrade and maintenance activities by existing broadband providers will be occurring alongside an increase in construction of new broadband facilities fueled by tens of billions of dollars in above-mentioned Federal assistance for deployment of broadband infrastructure.

Unfortunately, the surge in demand arrived at precisely the same time that semiconductor supplies became constrained. With chip manufacturers hit hard by COVID-19 and an uncertain future for the global economy, semiconductor production slowed significantly in early 2020. And when the economy began to recover more quickly than anticipated, including an increase in demand for information and communications technology products needed to work and learn from home, many suppliers were left unprepared. On top of these unprecedented challenges, various other factors—including trade restrictions, fires, and the devastating power outages in Texas—have further reduced supply.<sup>14</sup> The result for broadband providers has been increased wait times and increased prices for new equipment, both of which could eventually hurt American consumers. The impact is particularly significant for the larger chips that power modems, routers, and other network equipment. Semiconductor foundries, faced with growing demand, have focused increasingly on smaller, next generation chips that power mobile phones, smart home devices, and other consumer technology. With fabricators using their finite capacity to produce more dense/smaller chips, the broadband industry, automakers, and others who rely on larger, less dense chips have been constrained even further. The compounding of these events—many of which are unrelated—has exposed the limits of the global semiconductor supply chain.

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<sup>14</sup> NCTA is also aware of reports that foreign manufacturers and suppliers have been hoarding chips as a hedge against future supply constraints, including those that may result from U.S. trade sanctions. Such stockpiling has further reduced the supply of semiconductors available to those who are ready to put them to good use today.

With record demand for connectivity and unprecedented shortfalls in equipment availability, the health of American broadband networks depends on urgently finding solutions to the ongoing semiconductor shortages. While the needs of the broadband industry are manifest and increasingly acute, the supply chain crisis is impacting many industries across America and around the world. The interdependencies of the 21st century economy guarantee that the risks present in the semiconductor manufacturing and advanced packaging supply chain will impact virtually all industry sectors. Indeed, many sectors are jockeying to procure the chips they need to deliver their products and services ahead of others. The Commission, working with Congress and its agency partners, should ensure that the critical needs of the communications sector are addressed so that broadband providers, like all critical users of semiconductors, can benefit from the more robust supply chain that will result.

## **II. The Commission Should Support a Whole-of-Government Approach To Facilitate a More Reliable Supply Chain for Semiconductors While Considering All Available Tools To Streamline Technology Deployment**

While the short-term challenges of semiconductor availability require urgent action, it is equally important that the federal government consider long-term fixes that will build capacity and resilience into the supply chain. NCTA supports the President’s policy goal, expressed in E.O. 14017, of building “resilient, diverse, and secure supply chains to ensure our economic prosperity and national security.”<sup>15</sup> Building this supply chain requires investing boldly, yet strategically in domestic research, development, and manufacturing. Through the use of targeted incentives, new production capacity can be built in the United States that will reduce or eliminate the long-term risks to the supply chain. Work on many of these policies has already begun and

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<sup>15</sup> Executive Order No. 14017, 86 Fed. Reg. 11849 (Feb. 24, 2021).

the Commission should ensure that its activities advance—and where necessary add to—these ongoing efforts.

NCTA was encouraged when Congress voted—with large bipartisan majorities in both houses—to adopt the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, which includes provisions to encourage investment in facilities and equipment in the United States for semiconductor fabrication, assembly, testing, advanced packaging, and research and development.<sup>16</sup> Those provisions—part of Title XCIX, Creating Helpful Incentives to Produce Semiconductors for America (CHIPS for America)—advance several important policy goals, each of which aims to improve the supply chain for semiconductors. Among other things, CHIPS for America requires the Secretary of Commerce to establish a program to provide financial assistance to private and public entities to incentivize investment in facilities and equipment in the United States for semiconductor fabrication, assembly, testing, advanced packaging, or research and development. CHIPS for America also authorizes a fund to help secure international semiconductor supply chains, requires the establishment of a Microelectronics Leadership subcommittee within the National Science and Technology Council, and requires the formation of an industry advisory committee to assist the U.S. government on matters relating to microelectronics research, development, manufacturing, and policy.

While NCTA supports these efforts, the success of CHIPS for America depends on future appropriations from Congress to ensure that the necessary investments are made to establish a more secure and reliable supply chain. In line with President Biden’s recent expression of

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<sup>16</sup> See William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, Pub. L. No. 116-283 (2021).

support for \$50 billion in semiconductor manufacturing and research, as called for in CHIPS for America,<sup>17</sup> NCTA urges the Commission to work closely with Congress so that these important initiatives can be fully realized. Some of the proposals in Congress to address the chip shortage prioritize semiconductor production “at mature technology nodes” and support for semiconductor supply chains that serve vehicle manufacturing, which could result in skewing funding benefits in favor of the auto industry. We recognize the seriousness of the auto industry situation, but the impact of the chip shortage on the broadband industry is every bit as dire. Further, unlike the situation with the auto industry, the most harmful effects of the shortage for broadband may be ahead of, and not behind, us—particularly if the chips remain scarce for longer than expected, as some experts predict. The Commission should underscore the adverse impact of the chip shortage on the broadband industry, and the potential cascading effects that impact could have on other portions of the economy. The Commission also should work closely with Congress on additional legislative proposals, such as the U.S. Innovation and Competition Act of 2021, that would improve the semiconductor supply chain and advance investments in cutting-edge technologies like artificial intelligence and quantum computing.

We also encourage the Commission to consider what tools it may have to facilitate the efficient deployment of secure critical broadband technologies. For example, the Commission should consider whether its equipment authorization rules and procedures could be streamlined to expedite deployments of new equipment used in providing access to broadband services. Moreover, the Commission should foster the development of new broadband technologies through grants of experimental licenses and other measures that facilitate innovation. Such

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<sup>17</sup> The White House, *Fact Sheet: The American Jobs Plan* (Mar. 31, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan>.

grants might allow broadband providers to use alternative approaches that are less reliant on equipment that is difficult, if not impossible, to procure today.

Finally, the Commission should work to coordinate its activities with other government actions on semiconductors and supply chain security, such as those undertaken by or underway at the Department of Commerce.<sup>18</sup> Working together with broadband providers, the Commission has set aggressive goals for purging equipment from American networks that presents security threats. Yet thousands of small broadband providers have only recently begun to eliminate equipment from manufacturers including Huawei and ZTE. These equipment-replacement efforts will likely lead to a rush by providers to obtain new equipment and could further stretch supplies already limited by the semiconductor shortfall. The Commission's endeavors on the semiconductor supply chain should work in harmony with efforts from across government and industry to secure additional aspects of the American supply chain, including that for the communications sector more broadly.

## CONCLUSION

NCTA encourages the Commission to evaluate the risks posed to the communications sector by restrictions in the semiconductor supply chain, while advancing policy proposals that will ensure that the paramount national interest in supporting increased broadband deployment is recognized and access to semiconductors to achieve this important national objective is appropriately prioritized.

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<sup>18</sup> See generally Dep't of Commerce, *Risks in the Semiconductor Manufacturing and Advanced Packaging Supply Chain*, RIN 0694-XC073, Notice of Request for Public Comments, 86 Fed. Reg. 14,308 (Mar. 15, 2021); Dep't of Commerce, *Securing the Information and Communications Technology and Services Supply Chain*, 86 Fed. Reg. 4909 (Jan. 19, 2021) (to be codified at 15 C.F.R. pt. 7); Dep't of Commerce, *Securing the Information and Communications Technology and Services Supply Chain: Licensing Procedures*, 86 Fed. Reg. 16,312 (Mar. 29, 2021).



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